

Description of a new species of *Polyodontes* Renieri in Blainville, 1828 (Polychaeta: Acoetidae) from Papua New Guinea

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ABSTRACT

A new species, *Polyodontes vanderloosi* sp. nov., from off Lawadi village, Papua New Guinea, is described and illustrated by figures and unique underwater photographs of the animal while still alive. A comparison with the similar species *P. atromarginatus* Horst, 1917 and *P. tidemani* Pflugfelder, 1932 showed that the main distinguishing characters of *P. vanderloosi* sp. nov. are: (1) palps with rows of small papillae and with very long, digitiform papillae, often with bifid or multifid tips, distributed in the middle to subdistal part of the palps; and (2) five anterior pairs of elytra covering the dorsum completely.

KEYWORDS: Polychaeta, Acoetidae, *Polyodontes*, new species, systematics, Papua New Guinea.

INTRODUCTION

Recently, during a dive in the vicinity of Lawadi village, Papua New Guinea, one of us (R.S.) observed several scale worms belonging to the family Acoetidae Kinberg, 1858 protruding from their tubes. Although he had spent many hundred diving hours at this locality over many years and at different seasons he had never seen these acoetids before. After numerous hours observing and photographing the animals, finally one of them was speared in its tube and subsequently extracted from it. A close examination of the specimen and comparison with similar species described previously (Pflugfelder 1932; Pettibone 1989) showed that it belonged to a new species of the genus *Polyodontes* Renieri in Blainville, 1828. Below, this new species, *Polyodontes vanderloosi* sp. nov., is described, figured, and compared to similar species. Additionally, unique underwater photographs corresponding to the described specimen protruding from its tube are provided. The holotype is deposited in the collection of the Museum and Art Gallery of the Northern Territory, Darwin, Australia (NTM).

SYSTEMATICS

Family Acoetidae Kinberg, 1858

Genus *Polyodontes* Renieri in Blainville, 1828

Polyodontes vanderloosi sp. nov.

(Figs 1–3)

Type material. HOLOTYPE – complete specimen, NTM W18652, Lawadi village, approximately 10°15' S

150°40' E, D'Entrecasteaux Islands, Milne Bay Province, Papua New Guinea, 30 March 2003, speared in its tube at night, 7 m, coll. R. Steene.

Description. Holotype 520 mm long, 24 mm wide for about 210 segments (complete specimen). Body long, vermiform, more or less colourless in alcohol, light orange to brownish in life. Elytra present on segments 2, 4, 5, 7, 9, ... to end of body. Anterior six pairs of elytra large, rounded; in alcohol, surface with small orange spots, more densely pigmented mainly near anterior and outer lateral margins (Fig. 1B); in life, complete surface bright orange with white spots (Fig. 3B–D); of the anterior six pairs of larger elytra, only first five pairs covering dorsum completely (in alcohol). Following elytra oval, not covering dorsum, with brownish pigment in alcohol near margins (Fig. 1C), greyish with white spots in life (Fig. 3D).

Anterior end (Figs 1A, 3B–F): prostomium bilobed, with bulbous ommatophores with distal lenses and long necks (slightly contracted due to fixation). Ceratophore of median antenna inserted in middle of prostomium, with few lateral papillae; style of median antenna about as long as ommatophores, abruptly tapering subdistally; posterior pair of sessile eyes lateral to ceratophore. Lateral antennae inserted ventrally below ommatophores, tips visible dorsally, abruptly tapering subdistally. Palps tapering, about three times length of median antenna, with rows of small papillae and with very long, digitiform ones, often with bifid or multifid tips, distributed in middle to subdistal part of palps. Pharynx not everted, not investigated. All prostomial appendages with scattered brownish pigment.

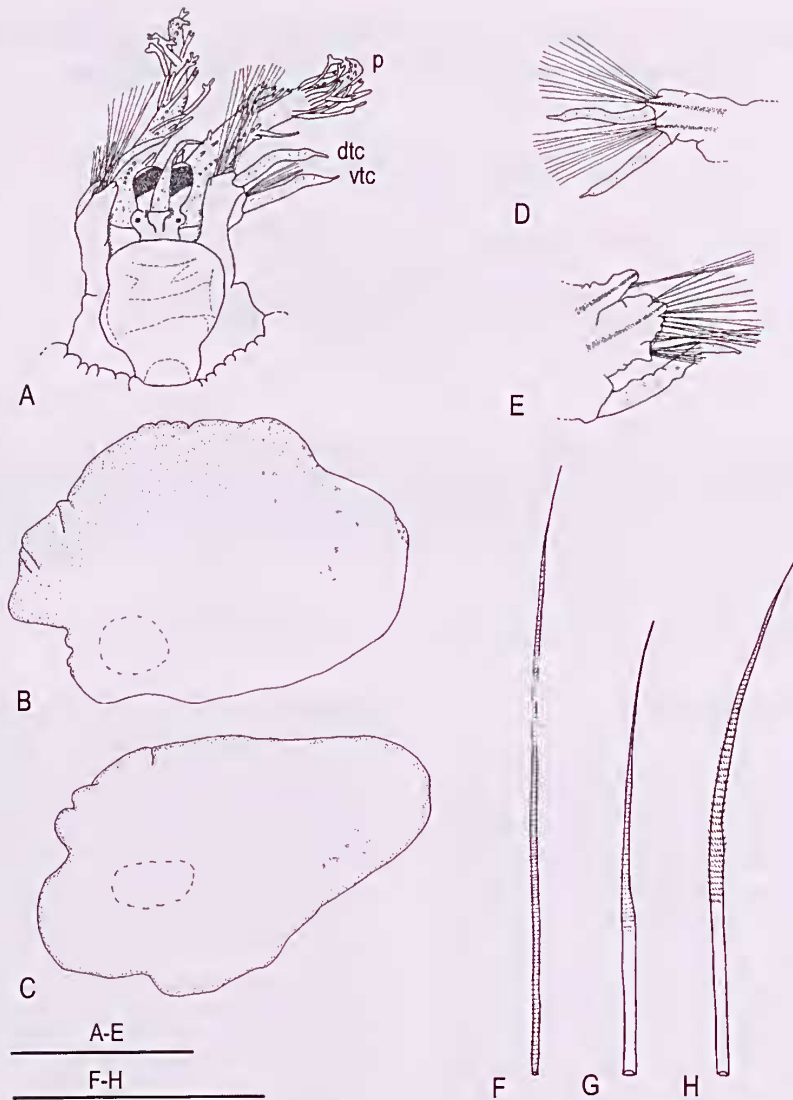


Fig. 1. *Polyodontes vanderloosi* sp. nov., holotype NTM W18652: A, anterior end with ommatophores and palps slightly contracted due to fixation, and left lateral antenna and ventral tentacular cirrus bent downwards; B, left second elytron from segment 4; C, left tenth elytron from segment 19; D, left tentaculophore, lateral view; E, left elytragerous parapodium of segment 2, anterior view; F, capillary notochoeta of same; G, upper neurochaeta of same; H, lower neurochaeta of same. Abbreviations: p, palp; dtc, dorsal tentacular cirrus; vtc, ventral tentacular cirrus. Scales: upper scale: 4 mm, lower scale: 1 mm.

Tentacular segment distinct dorsally; tentaculophores lateral to prostomium, each with a row of small papillae on inner dorsal side, a pair of acicula and rounded projecting acicular lobes, two bundles of capillary chaetae, and dorsal and ventral tentacular cirri similar to style of median antenna (Fig. 1A,D). Second segment with first pair of elytra, long ventral buccal cirri, and biramous parapodia; notopodia with acicular lobe projecting, rounded, on anterodorsal side of larger neuropodia, and with bundle of long spinous capillary notochoetae; neuropodia wide, subconical with anteroventral bract; neurochaetae slightly enlarged basally, tapering to capillary tip, with numerous rows

of spines, shorter in upper and longer in lower neurochaetae (Fig. 1E–H). Third segment with first pair of dorsal cirri, with short cirrophore and tip of tapering style extending beyond neurochaetae; shape of parapodia and chaetae as in segment 2, except for appearance of middle stout acicular neurochaetae (Fig. 2A). In segments 4 to 8, notopodia becoming smaller and notochoetae shorter.

Beginning with segment 9, notopodia wide, rounded, flattened, on anterodorsal side of neuropodia, with spinning glands and row of short spinous capillary notochoetae (Fig. 2B,C). Neuropodia with prechaetal acicular lobe rounded and postchaetal lobe truncate

with more or less well developed anteroventral bract (Fig. 2B,C); neurochaetae occurring in three groups: (1) upper group emanating from anterodorsal bract, not hidden by notopodium, of two types (as defined by Pettibone (1989)): (a) long, slender, slightly enlarged basally, tapering to capillary tip, and with numerous rows of short spines (Fig. 2D); (b) shorter, tapering to sharp tip, bipinnate, with widely spaced spines (Fig. 2E); (2) middle group of stout acicular neurochaetae, with tip slightly hooked, not aristate and without subdistal spines (Fig. 2G); and (3) lower group emanating from anteroventral bract numerous, slender, curved, enlarged basally, tapering to capillary tip, with numerous rows of longer spines (Fig. 2F).

Dorsal cirri tapering, with scattered brownish pigment; style longest on segment 3, becoming gradually shorter subsequently and cirrophore becoming wider (Fig. 2A–C). Ventral cirri tapering, with scattered brownish pigment; buccal cirri (on segment 2) reaching about to tips of neurochaetae (Fig. 1E); on segment 3 ventral cirri much shorter, reaching about to distal margin of neuropodia only, becoming even shorter more posteriorly (Fig. 2A–C). Parapodial branchiae present on anterior part of body, difficult to discern more posteriorly, occurring in two groups: (a) dorsally close to cirrophores or elyrophores, more or less globular, starting on segment 8; (b) medially to ventral cirri, globular to digitiform, starting on segment 11 (Fig. 2B,C).

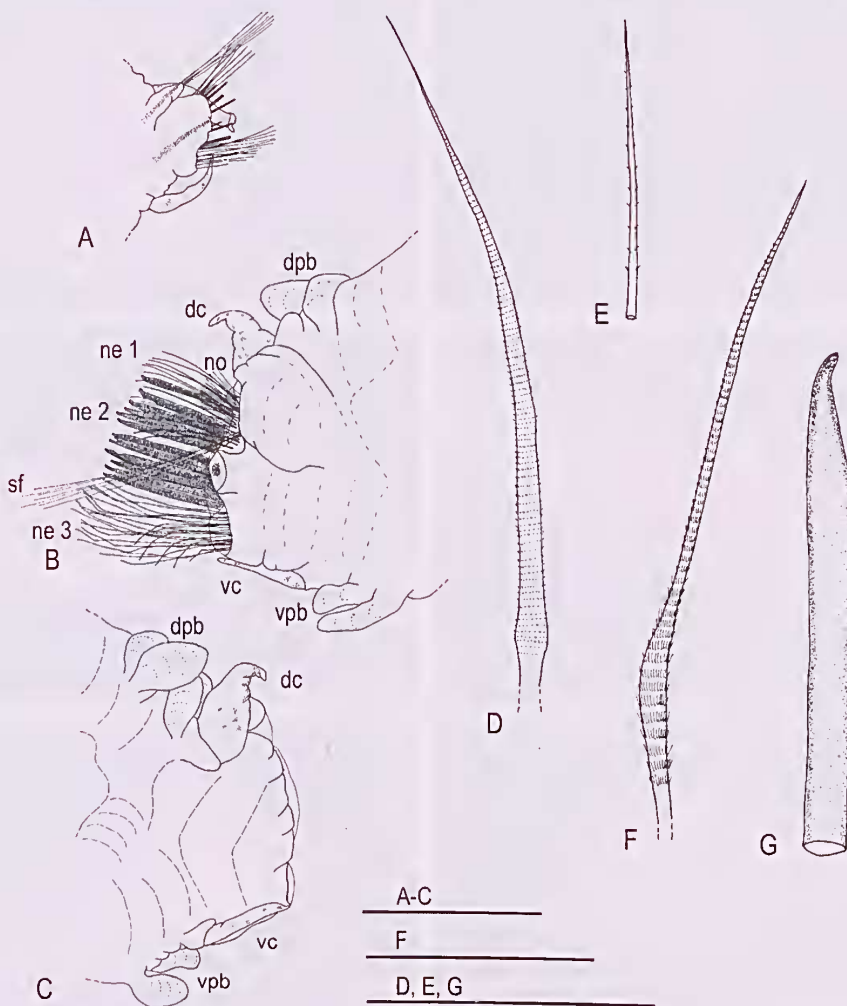


Fig. 2. *Polyodontes vanderloosi* sp. nov., holotype NTM W18652: **A**, left cirriferous parapodium of segment 3, anterior view; **B**, right cirriferous parapodium of segment 36, anterior view; **C**, the same, without chaetae, posterior view; **D**, upper neurochaeta of type 'a' of the same, distal part; **E**, upper neurochaeta of type 'b' of same; **F**, lower neurochaeta of the same, distal part; **G**, middle acicular neurochaeta of same. Abbreviations: dc, dorsal cirrus; dpb, dorsal parapodial branchia; ne 1–3, neurochaetae of upper (1), middle (2), lower (3) group; no, notochaetae; sf, spinning fibres; vc, ventral cirrus; vpb, ventral parapodial branchia; vte, ventral tentacular cirrus. Scales: upper scale: 4 mm, middle scale: 1 mm, lower scale: 0.5 mm.

Pygidium with dorsal anus and one pair of slender, tapering anal cirri, not longer than dorsal cirri of previous segments.

Tube. Leathery, protruding about 100 mm from substrate, overgrown by algae on top; distal end of tube soft, flap-like (flaps cut off for photos, repaired by worm within 24 hours) (Fig. 3A). Outside width of tube: with algae about 100 mm; tube only 60 mm; tube wall in layers, could be peeled away down to about 40 mm width.

Etymology. The species is named in honour of Rob Vanderloos, the boat skipper, who took one of us (R.S.)

not only numerous times to the diving locality, but assisted and helped in many other ways.

Remarks. Among the *Polyodontes* species with long palpal papillae, i.e. *P. atromarginatus* Horst, 1917 and *P. tidemani* Pflugfelder, 1932 (see Pettibone 1989), *P. vanderloosi* is unique due to the following characters: (1) palps with rows of small papillae and with very long, digitiform ones, often with bifid or multifid tips, distributed in middle to subdistal part of palps; and (2) five pairs of anterior elytra covering the dorsum completely (Figs 1A–C, 3B–F).

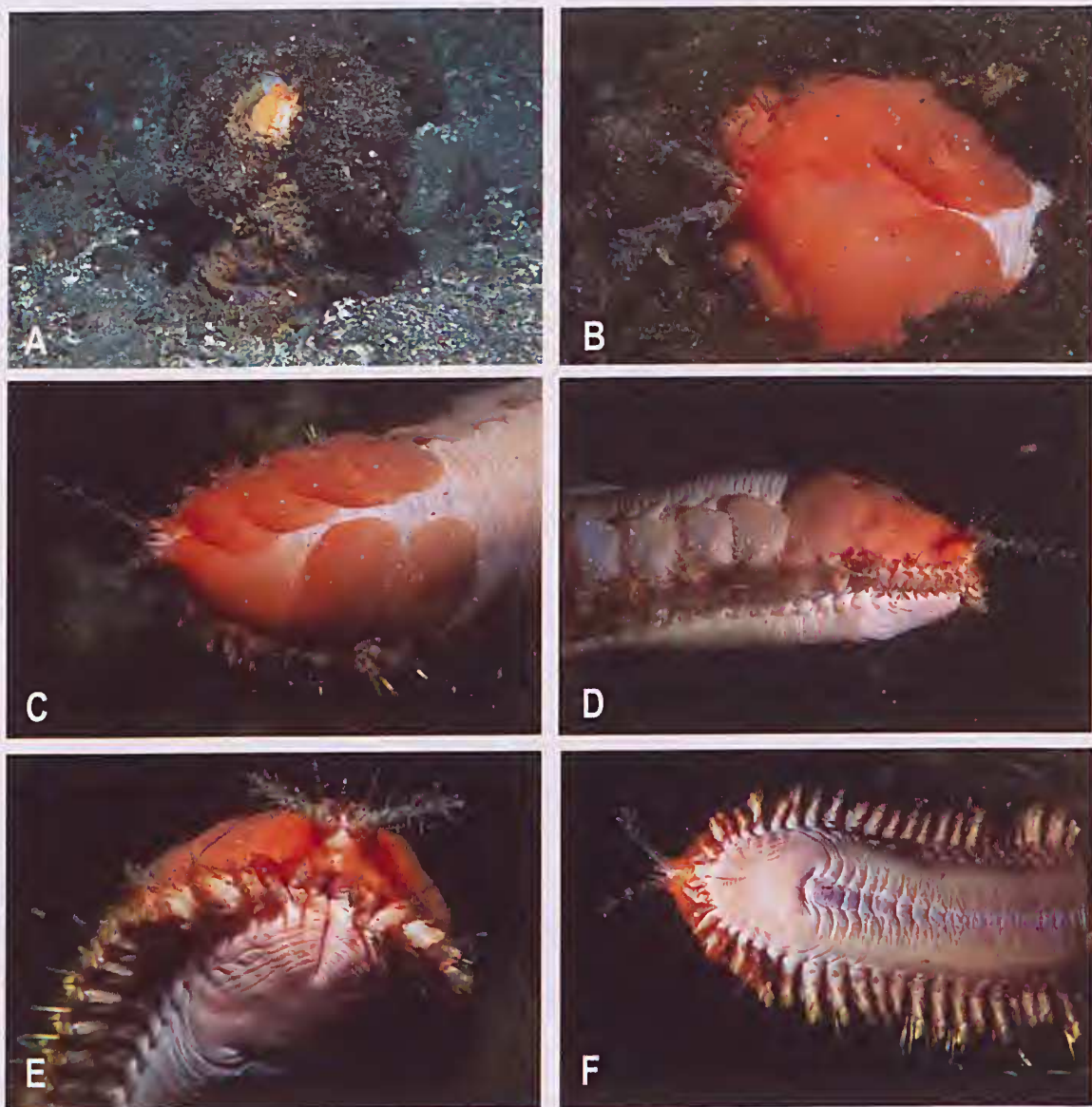


Fig. 3. *Polyodontes vanderloosi* sp. nov., holotype NTM W18652 (pictures of live animal in situ): A, animal within its tube, with distal flaps of tube cut off; B, close up of head, dorsal view; C, animal protruding partly, showing large, orange anterior elytra, dorsal view; D, the same, lateral view; E, the same, frontal view; F, anterior part of animal, ventral view. Photos: R. Steene.

In *P. atromarginatus* in contrast, the long palpal papillae have exclusively entire tips and the dorsum is covered by the three anteriormost pairs of elytra only. Furthermore, *P. atromarginatus* differs from our new species by having posterior eyespots situated anterolaterally to the ceratophore of the median antenna, parapodial branchiae absent, acicular neurochaetae aristate at tip and some with subdistal spines, and neurochaetae of type 'a' with numerous long spines along one side only. In *P. vanderloosi* on the other hand, posterior eyespots occur laterally to the ceratophore (Fig. 1A), parapodial branchiae are present (Fig. 2B,C), acicular neurochaetae are not aristate and never have subdistal spines (Fig. 2G), and neurochaetae of type 'a' have numerous rows of short spines (Fig. 2D).

In comparison to *P. vanderloosi*, the major distinguishing characters of *P. tidemani* are: only long palpal papillae with entire tips; and only the first pair

of elytra covering the dorsum (see also Pflugfelder 1932). Additionally, in *P. tidemani* the acicular lobes of the tentaculophores are distinctly pointed and some acicular neurochaetae show subdistal spines, while *P. vanderloosi* has rounded acicular lobes of tentaculophores (Fig. 1D) and the acicular neurochaetae never show subdistal spines (Fig. 1G).

Regarding its size, the holotype of *P. vanderloosi* is up to now not only the largest of all specimens considered herein (see Table 1), but also one of the few acoetids of this size being intact and complete after collection.

Differences in pigmentation of anterior elytra and dorsum, as given in Table 1, are only visible in well preserved material and should only be used in combination with other characters for identification. For a summary of the characters and species considered herein, see Table 1.

Table 1. Main distinguishing characters of *Polyodontes vanderloosi* sp. nov., *P. atromarginatus* and *P. tidemani* (* only width comparable since, except for *P. vanderloosi*, the largest specimens known are anterior fragments).

	<i>P. vanderloosi</i> sp. nov.	<i>P. atromarginatus</i> Horst, 1917	<i>P. tidemani</i> Pflugfelder, 1932
Pairs of anterior elytra covering dorsum completely	five	three	first only
Palps	with rows of small papillae and with very long, digitiform ones, often with bifid or multifid tips, distributed in middle to subdistal part of palps	with small papillae and longitudinal rows of extra long curved ones, tips entire	with four or five longitudinal rows of long papillae, tips entire
Posterior eyespots	lateral to ceratophore of median antenna	anterolateral to ceratophore of median antenna	lateral to ceratophore of median antenna
Acicular lobes of tentaculophores	rounded	rounded	pointed
Parapodial branchiae	present from segment 8	absent	present from segment 10
Tips of acicular neurochaetae	slightly hooked, not aristate and without subdistal spines	slightly hooked, aristate, in middle parapodia some with subdistal spines	slightly hooked, not aristate, in middle parapodia some with subdistal spines
Neurochaetae of type 'a'	with numerous rows of short spines	with numerous long spines along one side	with numerous rows of short spines
Size (*) of largest specimen	width: 24 mm	width: 13 mm	width: 13 mm
Pigmentation of anterior elytra (in alcohol)	with small orange spots, more densely pigmented mainly near anterior and outer lateral margins	with scattered black spots and darker band on posterior and medial borders	absent
Pigmentation of dorsum (in alcohol)	absent	with brown transverse bands	absent
Distribution	Papua New Guinea (Milne Bay Province, off Lawadi village)	Indonesia, Philippines, Gulf of Tonkin, Solomon Islands, Australia (Queensland)	Indonesia (Moluccas)
Reference	this work	Pettibone (1989)	Pflugfelder (1932); Pettibone (1989)

Distribution. Indo-Pacific, Coral Sea: Papua New Guinea, Milne Bay Province, off Lawadi village (D'Entrecasteaux Islands).

Habitat and biology. The holotype was found together with four other individuals in an area of 1 square metre, with tubes protruding from a sandy substrate, in 7 m depth. It was observed at this locality and depth for the first time, although numerous years and diving hours were spent at this locality by one of us (R.S.). Palps were seen to be protruding from tube mostly at night, occasionally also in daytime; the pharynx was everted to swallow small pieces of fish fed to the worm. The large, orange elytra were observed to flap often around the "head".

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